

Brushless DC Motor and Resolver for Venusian Environment, Phase I



Completed Technology Project (2007 - 2007)

Project Introduction

In response to the need for motors and actuators that can operate in the harsh venusian environment for extended periods of time, on the order of several hours to days, Honeybee Robotics proposes continued development of an extreme temperature brushless motor and a position feedback device (resolver or tachometer) and a demonstration of both in simulated Venus surface conditions. During Phase I a first-generation prototype motor/resolver will be designed, built, and tested in Venus-like conditions (486

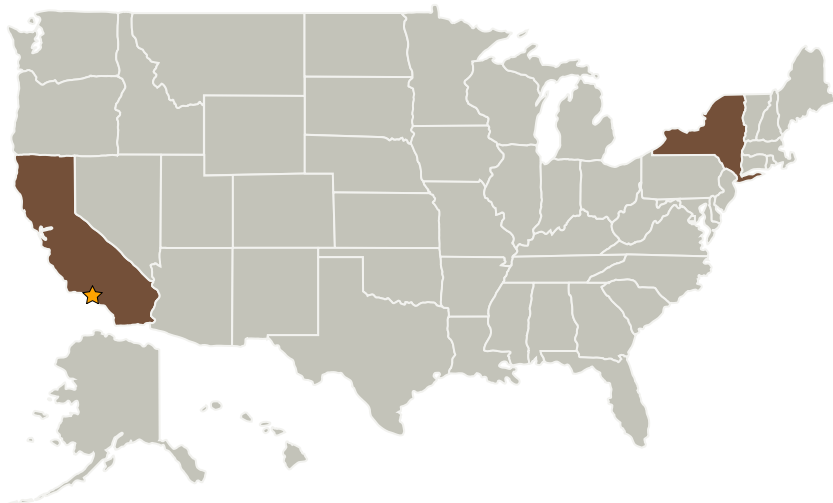
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C temperature and mostly CO₂ gas environment). Phase I testing will verify the feasibility of the designs and confirm that the motor/resolver combination can operate at 486

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C for an extended period of time. Fully developed and optimized versions of this motor/resolver could be used to actuate drills, robotic arms, and other devices outside of an environment-controlled landed platform on the surface of Venus. The device's ability to survive for hours (and potentially longer) in that environment is a major benefit to future Venus science missions. It would permit time for communication ground loops to optimize sampling and drilling target selection as well as allow for multiple samples to be acquired from the subsurface. In a potential Phase II effort, an extreme environment brushless motor/resolver combination will be developed to TRL 6.

Primary U.S. Work Locations and Key Partners



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Organizational
Responsibility**Responsible Mission
Directorate:**

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Honeybee Robotics, Ltd.	Supporting Organization	Industry	Pasadena, California

Primary U.S. Work Locations

California	New York
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.6 Extreme Environments Related to Critical System Health Management